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ABSTRACT

Social learning theory is the theory that is applied through microteaching. The two critical sets of social learning variables mediated through microteaching are those associated with modeling and feedback. Microteaching is also a way of bringing specific teaching responses under experimental and behavioral control. Thus in each microteaching session, the learner emits teaching responses which are reinforced through videotape feedback or are elicited by viewing teaching behavior which is modeled in videotape presentation. The purpose of research using microteaching which mediate these variables is to determine the optimum combination of modeling and feedback which strengthens specific categories of teaching responses. The research investigates the parameters of these variables which are most effective for eliciting desired teaching responses. Some interactions between type of response to be learned and type of treatment, modeling or feedback, have been found. Modeling has been found more effective than feedback when the modeling cues are highly discriminative. Feedback appears most effective with easily observed and reinforceable teaching behaviors. (Author)

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A BEHAVIOR MODIFICATION VIEW OF VIDEO PLAYBACK: MICROTEACHING

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Microteaching as a Behavior Modification Technique

Much of what has been written about microteaching is promotional and even misleading.[1] The claims made for its effectiveness have little substance in fact. More disappointing is the fact that the original conception and rationale for microteaching has been lost sight of, a point significant in the context of a discussion of behavior modification in teacher education. Originally, microteaching was devised as a procedure for facilitating behavioral control.[2] Further, it was used as a way of creating a more effective experimental paradigm which for the first time made it possible to use sophisticated experimental designs in training studies. The purpose of these training studies was to assess the relative effectiveness of modeling and reinforcement variables in facilitating the acquisition of teaching behaviors.

The most undesirable consequence of this promotion was that the role of behavior modification in training was obscured. When a trainee acquired a skill, it was because he or she had been reinforced for attempting the skill, or had observed a model performing the skill. Microteaching made it possible to apply these techniques with great efficiency.

Microteaching, as almost everyone knows, is a brief teaching episode. The length of the teaching session is typically in the range of five to twenty minutes. The size of the class is variable, usually four to seven students.

In the course of the early experimental research which studied the application of behavior modification technqiues, the length of the teaching session was shortened to five minutes. The reason for these choices were

practical. A series of five minute sessions interspersed with short feedback or demonstration sessions yielded a practicable number of learning trials for behavior modification experiments.

Aspects of microteaching are worth investigating for very practical reasons. The optimum length of the session ought to be studied as it bears on the learning of different skills. The sheer practice aspects of the technique ought to be studied. Systems of microteaching modules ought to be studied to assess the effect of consistent and integrated training on subsequent performance, and as a way of analyzing the acquisition and development of complex skills.

Beyond research of this kind there is very little else about microteaching as a methodological device that is worth studying. What is worth investigating is the applications of behavioral modification principles that can be made when microteaching is used.

Application of Behavior Modification Principles to Teacher Education

Teacher education programs may be conceptualized as behavior modification systems designed to modify complex behavioral repertoires which are adaptable to a variety of teaching problems. Developing a teacher education program which applies behavior modification concepts would be simpler if we knew how to use these principles to control student learning. But, at the present time only a relatively small number of student behaviors can be brought under behavioral control by applying these principles. Some of these are behaviors which the student must have available to participate in learning experiences; for example, bringing student attending behavior under behavioral control prepares students to acquire the behaviors which are the goals of

the learning system.[3] Behavior modification systems, however, have not been developed for teaching complex behaviors such as problem solving. Teacher behaviors, such as planning and evaluating whose effect on student learning is presumed to be significant, may be taught in systems which apply behavior modification principles but such systems are not yet widely used.[4]

There are three problems to be solved in designing behavior modification systems for teacher education. First, systems must be designed which facilitate the acquisition of diverse classes of teaching behavior such as developing goal descriptions, planning learning strategies, evaluating, establishing mutually self-enhancing relations with students, using teaching methods, and acquiring professional attitudes. The second problem is to train teachers to use applications of behavior modification principles particularly. The third problem is to develop behavior modification systems for the learning by students of such complex behaviors as reasoning, problem solving, and aesthetic evaluation, and, in turn devise ways of training teachers to use these systems.

Behavioral Analysis in Teacher Education

There are many reasons why behavior modification theory and practice have had relatively little impact on teacher education programs. One of the most important is the lack of agreement on training objectives which frustrates those who wish to change the training systems, and which frequently exposes them to charges of trivializing teacher education when they attempt applications of behavior modification principles.

The behavior modifier typically takes as a given the desirability of changing a response. In teacher education there is some agreement on

undesirable teaching behaviors, little agreement on desirable behaviors, and practically none on the significance of what is to be learned to teach.

Therefore, the first task in designing a behavior modification training system, behavioral analysis, is difficult to perform. Some will think quite correctly that a logical place to begin is to locate those teaching behaviors which have been shown to have a significant effect on student learning. But previous research is of little help in this respect.[5]

One strategy is to select either undesirable behaviors or a behavior which is likely to be useful in a variety of teaching situations.[6] Another is to become involved in the task of developing taxonomies of teaching behavior, a pressing need.[7] In any case the behavior modifier will find unrewarding his traditional stance, "Tell me what you want to teach, and I will design a system to teach it."

Application of Behavior Modification Principles in Teacher Training

Three questions should be answered in assessing the extent of the application of behavioral modification principles to teacher education: (1) what progress has been made in the response analysis of teaching acts; (2) how have reinforcement principles been applied; (3) how have modeling procedures been used?

Response Analysis in Teacher Education

Teaching behavior is not an unstudied phenomena. There are over fifteen hundred articles in the literature which identify, describe, or define about five hundred teaching behaviors. One would assume that such an abundant literature would describe a response system rather completely.

It does not for several reasons. One we may pass over quickly because it is a common defect in such analyses--the behaviors are frequently described as traits such as "enthusiasm", "warmth", "interest in students"; others describe characteristics of teaching methods such as "inductive teaching behavior", or characteristics of lessons such as "pacing" or "organization of ideas". That such descriptions need to be refined in terms of observable behaviors is obvious.

But there are other difficulties with these descriptions. Many teaching behaviors are contingent on the responses of students. Hence, a description must include a listing of the cues to which the teaching behavior is to be paired.

A third problem in the analysis of teaching behavior is that very little, if anything, is known about the connections among behaviors.

A fourth problem is that many teaching behaviors represent classes of behaviors which have a very large number of specific behavioral representations.

A fifth problem in the analysis of teaching responses is that one kind of student behavior may be linked to more than one kind of teaching behavior.

An analysis of teaching tasks, as the list of problems outlined above suggests, is going to require considerable empirical work that has not yet been done. Available descriptions of teaching behavior are more or less useful for this purpose, but the kind of information needed about response pairs is not available in the research on systems for observing and classifying teacher behavior.

Research on the Modification of Teaching Behavior

The use of the videotape camera and recorder and the development of microteaching have prepared the way for the application of behavior modification techniques to teacher training. However, there are relatively

few instances of the use of these devices in behavior modification paradigms. Rather they have been used in the practice-feedback paradigm. Their power for behavioral control has not been exploited because the behavioral analysis needed to create such power has been neglected.

Unfortunately, the widespread usage of the videotape recorder has led to the belief that it is a touchstone to instant success in training. The nostrums prescribed for its use are simplistic. For example, the "best" techniques for using the videotape recorder have been described by Cyphert and Andrews.[8] The methods suggested include immediate feedback to the trainee, and demonstration and feedback on specific teaching behaviors. Although these suggestions are reasonable, and even though they use the language of behavior modification, their application in research and practice shows little sophistication in behavior modification techniques. Most uses of the videorecorder do not focus on behavioral contingencies. Therefore, although these uses may have some influence on teachers' performances, they could be even more effective if behavioral modification principles were used.

These studies accomplish two purposes. They test popular conceptions of what constitutes appropriate feedback procedures. They also help us understand the kinds of contingencies that are likely to be effective in modifying teaching behavior.

Investigators, for example, have studied "openness to feedback,"[9] combinations of live supervision and supervision from videorecordings,[10] the relation of correction feedback to opportunity to practice after feedback,[11] critical self-appraisal,[12] and direct and indirect supervisory feedback.[13] With the exception of Aubertine's study, these studies

yielded no significant differences favoring any treatment. This lack of differences is, of course, not interpretable.

The consistent lack of differences across these different variations on feedback is striking. One explaination is that the lack of differences is due to poor experimental design and methodology. Another explanation is that the dependent variable is so grossly defined that it is simply a very poor metric for detecting treatment differences. The most persuasive explanation is that the treatments provide very weak contingency management.

The lack of results provides a cautionary note about assuming that videorecordings have some inherent magic for modifying behavior. It also alerts us that our common sense notions about the effective characteristics of supervisory feedback are simplistic.

An example of the appropriate use of a behavior modification paradigm is provided by an experiment by McDonald and Allen.[14] In this study, the dependent variable was a teacher response, rewarding student's participatory responses. Four experimental treatments were used: (1) self-viewing of one's videotaped performance, rating it on very general characteristics; (2) self-viewing, rating the performance on frequency of rewarding behaviors; (3) viewing one's performance with an experimenter who emitted positive reinforcers every time the desired behavior appeared on the videotaped projection; and (4) self-viewing with an experimenter who both reinforced the desired responses and noted instances where the responses should have been emitted.

Four learning trials were used. The teaching took place in the teachers' regular classes. Twenty-minute video recordings were made of

the main portion of the lessons which the teachers were to conduct as a discussion.

The third and fourth treatments produced significantly more behavior changes, the fourth yielding more than the third. Data were also collected on the frequency of student response. The same treatments produced significantly more student responses in the same pattern as was observed for the changes in the teachers' behavior.

The effectiveness of the treatments can be attributed to the contingency management procedure. Rewards were attached to the teacher's performance of the desired teaching behavior. As the frequency of the desired behavior increased the teacher received the rewards associated with the changes in student behavior. As the experimenter reviewed the trainee's performance he also pointed out these changes. Thus the reward contingencies were carefully managed.

Observational Learning and the Modification of Teaching Behavior

Despite what appears to be an almost universal acceptance of the importance of observational learning, training processes have been almost untouched by recent developments in social learning theory.[15] There is a paucity of research in teacher education on observational learning. Although there is an extensive literature on the observation of teacher performance, there is a miniscule number of studies on how to learn from observing.

A few comments on the observational paradigm are appropriate. To learn by observing another's performance three conditions are necessary: (1) the learner must be able to "watch" the actions of the person from

whom he or she is learning; (2) the learner must be "cued" on what is to be watched and adopted by him; (3) he must have the capacity for making the responses to be acquired. The "watching" process may be either direct observation of another's behavior or viewing of his performance on film and videotape, or reading a description of his performance, or listening to an audiotape of the other person's verbal performance.[16]

Other conditions include: (1) that the learner must be motivated to want to adopt the behavior of the person whom he is observing; (2) that he be reinforced for adopting the behavior, either vicariously, or by an external agent or event.[17]

To use these principles in teacher training requires only that training sessions be organized so that the principles are used. Essentially, this means that there must be an opportunity to observe a teaching behavior and reinforcing events associated with emitting the behavior.

A typical training paradigm includes a session for observing a model who emits a behavior to be learned by the trainee, followed by a session in which the trainee attempts the same behavior, followed by another session in which he is reinforced for those instances of the desired behavior which he has emitted. Videorecording and microteaching are very useful for organizing a tight and economical set of training sessions.

The trainee in the first session views a model performing a teaching behavior such as reinforcing students for participating in the classroom discussion. After watching the model, the trainee teaches a brief session in which he or she attempts the same behavior. This practice session is followed by another in which the trainee is reinforced for imitating the behaviors which he has observed.

The addition of this last session may be necessary because the teaching behavior emitted may not be reinforced during teaching. A teacher asking higher order questions, for example, may receive few, if any, answers of the kind she is hoping to elicit. She is not being reinforced for asking these questions, and is likely to stop asking them. A session in which she views her teaching with an experimenter provides an opportunity for reinforcing this behavior.

The research that has undergirded Bandura's social learning theory attacked the problem of the relation of reinforcing contingencies to the acquisition of behavior by observing another's behavior. The problem is quite complex.[18] In general, some kind of reinforcing event must be present even though it may be attached only to the model's behavior. The principle generally accepted is that observation by the learner is sufficient for acquiring a behavior even if this behavior is not reinforced during the acquisition. The necessary condition, however, is that the model's behavior must be reinforced by its consequences. It is also generally accepted that the behavior which has been acquired will be maintained in strength only if it is reinforced.

A study by Claus tested hypotheses about attaching reinforcement contingencies to the model's behavior and to the trainee's performance.[19] Claus assigned trainees randomly to one of four conditions. The training paradigm involved two viewing sessions, one of a model, the other, of one's own performance. An experimenter was present during both, neither, or one or the other of the two sessions, thus yielding four experimental treatments. The function of the experimenter was to point out instances of the desired behavior in the model's or trainee's teaching.

If we assume that cueing during the feedback sessions was a reinforcing event, then this experiment provides a comparison of modeling and reinforcement sessions during the acquisition phase of learning a teaching behavior. The assumption is plausible since the trainees knew what behavior they were to acquire.

The cueing during feedback had no significant effect. Even observing a model without cueing from an experimenter was more effective than cueing during a feedback session.

This study also supports another principle derived from other research relevant to social learning theory, that controlling the observer's attention is necessary. In Claus' study, a cued modeling session was more effective than a non-cued one.

This result is particularly important for developing training paradigms using modeling because it supports the necessity of using cueing procedures. The learner must actually observe the behavior to be acquired which seems rather obvious. But observing teaching is complicated by the large number of behaviors that may be observed. A cueing procedure is necessary to focus the trainee's attention on the behavior to be acquired.

Imitating a Teacher's Behavior

The idea of imitating another teacher's behavior arouses several different reactions. Slavish imitation is generally regarded as undesirable, and certainly as beneath an adult. Another view is that teaching requires creativity, so observing another teacher may be helpful as a way of storing problem solving alternatives. A third view is that imitating some classes of responses may be helpful but each teacher has his or her own style.

These views are somewhat removed from reality. Teachers do inquire of other teachers to learn effective teaching practices.

Therefore, we designed a study in which some trainees had to teach the same lesson as the model while others taught a lesson of their own choosing.[20] The trainees all taught a lesson of their own choosing in the last of the training trials thus providing a test of the transferability of the skills which were observed and to be learned.

Those trainees who practiced the same lesson as the model taught produced significantly more instances of the behavior which was to be observed. But the differences washed out on the transfer task. Our concern about the problem of generating new instances in a class of responses seemed justified.

Cueing

But, to sort out those characteristics of the modeling procedures which will make them uniformly effective is not easy. In the study described above we used two other experimental conditions to work on this problem. Some trainees saw a "pure" model, that is, one where only instances of the desired behavior occurred. Others saw a mixed model. But these differences in modeling conditions did not produce significant differences.

We had always used a minimal form of cueing. Trainees were given some information about the behavior to be learned but obviously this technique was not very powerful. The Claus study, discussed above, was designed to test a more powerful cueing which turned out to be highly effective. These results were particularly significant because the same

class of behaviors were studied as had been in the earlier experiment using pure and mixed models.

Symbolic vs. Perceptual Modeling

Considerable amounts of printed training materials are distributed to teachers. Some of these are descriptions of methods to be used; others are protocols of classroom interactions. They describe responses to be made or responses that were made. Presumably, a trainee can learn how to reproduce these responses from reading descriptions of them. (The conditions under which such learning occurs simply have not been studied.)

This type of presentation has been called symbolic modeling because the responses to be acquired are described in symbols, words. It contrasts to perceptual modeling which is a display of an actual performance, live or mediated. Although it may seem that perceptual modeling will be more effective than symbolic modeling, the difficulties involved in controlling an observer's attention when he is viewing a performance considerably attenuate whatever advantages such displays may have, as we have seen.

We ran several studies comparing these two kinds of modeling. One is included in the study described above using pure and mixed models and two kinds of practice sessions. The models were presented both in symbolic and perceptual forms but these treatments also yielded no significant differences.

The first study comparing these modes was done by Orme and is reported in McDonald and Allen.[22] Orme varied the two modes to give them different degrees of assumed strength. For example, during feedback sessions an experimenter provided instructions on where instances of the behavior being learned might occur. In other conditions, an experimenter cued the

observer while the latter watched the model. There were no significant differences among the groups though the means lined up in the predicted order of differences in effectiveness. These results were particularly disappointing since the treatments had the necessary conditions in them, such as cueing, and the behavior to be learned was a simple, process-type response.

An experiment by Koran[23] which contrasted modeling to a problem solving training technique, and used symbolic and perceptual models also produced no differences between the modeling modes. Again, however, his results were only suggestive since his group differences, although not statistically significant, were arrayed according to his predictions.

We were encouraged by the consistency of the results, though we were well aware that they had little meaning because of the lack of statistical significance. The only explanation that we could generate for the kinds of results we were getting was a statistical one, that there were too many experimental conditions for the number of trainees in each. Latter experiments, such as the one done by Claus, reduced the number of treatments and found modeling conditions to be differentially effective.

One line of attack on this problem was to study the effects of differences in aptitude for processing the different kinds of information represented in symbolic and perceptual models. Perceptual models require aptitudes for processing visual information; symbolic models, aptitudes for processing semantic information. Perhaps the lack of differences that we were finding resulted from using measures of the performances of learners with different aptitudes who had been exposed to the same type of model.

Koran[24] used symbolic and perceptual models with trainees whose

aptitudes for processing different kinds of information had been measured. She found statistically significant differences favoring the perceptual modeling treatment and complex interactions between aptitude and treatment. These interactions did little to improve our understanding of the function of aptitude in this kind of training.

This summary of research and experience should make clear that the problems of using modeling procedures for facilitating the acquisition of teaching behavior are complex. The results are consistent with previous research but not as conclusive. When results were not significant, they were at least seemingly ordered in line with theoretical expectations. It did make sense that the experimental designs were so complicated that they were leading us into a Type II error.

In my opinion there is little question that this line of research should be continued. There is every reason to believe that the easy availability of the videorecorder will stimulate the use of demonstrations in training. We ought to learn how to make effective use of modeling concepts and principles. Economy and efficiency will be achieved if we can develop more effective procedures.

Two major lines of inquiry should not be overlooked. The optium relation of modeling to reinforcement techniques has not been found. The optium differential use of both kinds of procedures for learning different kinds of teaching behavior has not been studied.

CONCLUSION

This paper describes the use of behavior modification procedures that influence teaching behavior. Microteaching was the technology that

facilitated the application of behavior modification principles. Microteaching is a powerful tool for applying these principles but its full potential has yet to be exploited. Further, despite its demonstrated utility in this respect few training programs have adopted the proceedings developed in these experimental studies. Unfortunately, many people still believe that microteaching's benefits are associated with providing practice. Nothing in these studies can lead to that conclusion because all trainees practiced an equal amount.

If microteaching is to be maximally useful, it must incorporate manipulation of variables known to significantly influence the acquisition of teaching skill. Otherwise, it will be little more than modestly controlled practice.

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